VISCED – Final Report on Teacher Training

VISCED
A Transnational Appraisal of
Virtual School and College Provision

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FINAL REPORT ON TEACHER TRAINING

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Author[s]	Niki Davis
Contact name	Niki Davis
Organisation	University of Canterbury e-Learning Lab
Address	25 Bengal Drive, Christchurch 8022, New Zealand
Telephone	+64 3337 5152
Email	professornikidavis@gmail.com
Contributors to document	Niki Davis
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Abstract	Teacher training has a continuum that includes initial teacher education, induction and continuing professional development; it is closely connected to quality assurance and learning outcomes. This report covers all of these phases with detailed description of a range of offerings in different regions of the world. There are also variations due to the decoupling of the role of the traditional classroom teacher into a number of roles including the central complementary roles of one or more distant eTeacher(s) and adult(s) who facilitate student(s) aged 14-21. Recommendations include raising awareness of the importance and value of teacher training for many roles including staff working with an eCampus and in initial teacher education, as well as researching and developing effective teacher training suited to particular regions and clientele in Europe.
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1. Introduction

1. Background

VISCED has produced a transnational appraisal of virtual school and college provision with a typology of virtual school and college services that shows an enormous variation in organisational models and practices (see the VISCED Handbook Volume 1). A co-evolutionary perspective of digital technologies and education suggests that the wide variation is related to the interlinked ecologies where the school or college emerges (Davis 2010; Davis, Eikelmann & Zaka 2013 In Press). Perhaps the only common feature is that all have both teachers and learners that are connected via digital technologies using the concept of an e-campus that includes some young people in the age range of14-21 years old.

Extensive research of factors that impact the quality of education for such learners have clearly identified the major impact of the quality of the teacher (e.g. Hattie 2009; Cumming & Jasman 2003; Darling-Hammond, 2010; 2012), and that teacher quality is improved with teacher training (also known as teacher education and continuing professional development) (Timperley, Wilson, Barrar & Fung 2008). Hence the relevance and importance of this VISCED report.

The European Commission's (http://ec.europa.eu/education/policies/2010/doc/principles_en.pdf) "Common European principles for teacher competencies and qualifications" recommends that "the teaching profession should be seen as a continuum which includes initial teacher education, induction and continuing professional development" (2010: 4). Teacher training (also known as teacher education) is a career long process that begins for public school teachers in most countries with initial teacher training (also known as preservice teacher preparation). In contrast many college teachers begin their training on the job and this is also possible for some of the teachers in private schools. Following initial teacher education, public school teachers also begin to teach with a period of induction and become fully licensed to teach only after a period of successful practice, which is commonly around two years. Teachers continue their professional development (CPD) career long in order to update and improve their practice.

Calls for high quality teachers and outcomes for learners in schools have arisen from the variety of reports on teaching, teacher training and the profession (Cumming & Jasman 2003). A central tenet is that standards are essential to the successful professionalization of teaching and several studies have demonstrated that standards can serve as a powerful tool to stimulate teachers to learn more about teaching and learning and develop their practice, including the opportunity for teachers to play an active role in self-directed enquiry with relevant standards to frame their formative development (Darling-Hammond 2010; 2012).

In the 21st century there have been major developments in learning and teaching that have or are being incorporated into teacher training, which include revised understanding of how people learn, including teacher learning (e.g. Bransford et al. 2000

http://www.nap.edu/openbook.php?record_id=9853&page=190). These are stimulating many changes in curriculum and assessment practices. Perhaps most relevant to this report for teachers in virtual schools and colleges is the embedding of information and communication technologies (ICT) in teacher training. For example, Niki Davis' entry in the most recent International Encyclopaedia of Education describes the three main goals of embedding ICT in initial teacher training as follows.: "(1) preparing teachers to use ICTs in educationally effective ways; (2) preparing K-12 teachers to teach ICT related content; and (3) applying ICTs to serve teacher education. In essence technology is a cross-curricular theme, a content area, and *a tool that can be applied to learning and teaching*, which includes the use of telecommunications to improve access to education." (Davis, 2010: 217) Note the final phrase (in italics), because the emergence of virtual schools and colleges depends on the application of telecommunications tools, including the Internet, applied as a medium for schooling. This should not be confused with online learning applied to teacher training, including initial teacher education. Although useful, online teacher training does not prepare teachers for online teaching any more than being a student in school prepares them for teaching in campus-based school; which is to say that while experience as an online learner is useful, it is not sufficient.

There have also been important developments in relation to 21st century skills to be incorporated into the teaching and practice of teachers of students in secondary schools and colleges. This is highly relevant to the development of 21st century skills when teaching with an eCampus, particularly as teachers tend to revert to more traditional modes when challenged with a new mode of work (Li & Pratt 2010). The summary of the 2011 EdusummIT (http://edusummit.nl/) clearly recognised that 21st century skills require drastic changes to a traditional class on campus, that we may be similar to a traditional correspondence mode of study for an eCampus (Resta et al. 2013 in press; Resta, Searson, Patru, Knezek & Voogt, 2011: 6): "The implementation of 21st century skills requires drastic changes to the traditional classroom, in which the teacher lectures in front of the classroom and student take notes or do worksheets. A 21st century learning environment must be created in which students are actively engaged in "constructivist activities", such as collaborating, working on projects, searching for information, designing products, and publishing and presenting their work." The same report also recognised the importance of leadership and its development, and the challenge that many school leaders have little knowledge of ICT-enabled 21st century learning (p 8).

Finally it is important to note that the role of the campus-based school teacher is often de-coupled or spread among a number of people and so, as discussed later in section (2), there are a number of people who need teacher training in addition to the teacher who has day-to-day management of students.

2. The brief

This is Deliverable D3.10 from Work Package 3. The description from the work plan states:

The recommendations will cover not only "what" is to be taught (with a strong focus on "21st century skills for teachers" but also "how" it should be taught (distance, classroom or school-based), with consideration of the potential benefits of teaching ICT-based pedagogy through ICT-based pedagogy

The lead partner is P9 Aarhus, with assistance from Sero, TIEKE and Ross Tensta. This team produce the interim report as planned. In September 2012 Sero subcontracted Niki Davis to produce the final report.

3. Using this report

It is important that readers orient themselves with the introduction and to consider who teacher training is for before moving on to the descriptions of practice. This is because there is research evidence that those who have not been exposed to schooling involving eCampus or virtual school commonly have inaccurate beliefs and preconceptions (Compton & Davis 2010; Charina 2009).

The main section of the report provides an extensive review of teacher training that has evolved in the 21st century including, most recently, courses that explicitly include 21st century skills. The range of teacher training is ordered across the career of teachers beginning with initial teacher training.

The report concludes with a small set of recommendations to inform policy makers, those who provide teacher training and staff involved with eCampus that provide courses for students aged 14-21.

2. Teacher training for whom?

The introduction of eCampus in schooling and colleges in many countries collected in the VISCED wiki and summarised in the VISCED Handbook has impacted the role of educators in many ways. The evolution and de-coupling of the work of a classroom teacher in schools and colleges is important because of the variety of practice and purpose for which a teacher training is designed and implemented. But first it is important to note that the start up phase has not always included teacher training due to the innovative nature of such organisations that emerge to fit particular needs and ecologies, as explained by Davis, Eikelmann and Zaka (2013). In the early stages of the VISCED project it was difficult to identify any teacher training, particularly in European countries, and an important recommendation of the interim report was the teacher training must blend pedagogy as well as technology and that pedagogy often related to its context and culture (Sorensen et al. 2012).

Susan Lowes' (2007) chapter on professional development for online teachers in the USA starts with three important distinctions to assist in the interpretation of the diversity of professional development that is being offered and required for staff in a virtual school that she then illustrates with four cases of schools that have existed for long enough for issues of cost-effectiveness and quality management to signal the need for teacher training and ongoing professional development among each school's community of practice. VISCED's five levels (Handbook Volume 1, page 20) can

be seen within Lowes' distinctions (2007: 161-164) include 'fully virtual school/college' and 'virtual school-in-school':

- Virtual schools that provide full diplomas versus organisation that provide courses into site-based schools.
- Virtual resources versus whole virtual courses versus complete classes of students in one virtual course
- Professionally developed courses, versus teacher-adapted courses (to which we can add teacher creating and teaching their own courses)

According to Davis and Compton (2010) "Virtual school [VS] experiences over the past decade have shown that effective virtual teachers have qualities and skills that differ from traditional face-to-face teaching, such as building and maintaining a sense of trust and community among individuals who will never meet face to face. Thus, it would be foolish to assume that "people who have never taught in this medium can jump in and teach a class…A good classroom teacher is not necessarily a good online teacher" (Wood, 2005, p. 36). Davis and Rose (2007) reported that common misconceptions about VS included the expectations that "any regular classroom teacher… [could be] qualified to teach online" and "newly qualified teachers who learn about virtual schooling in their preservice programs will be ready to teach online when they graduate" (p. 8). Without deliberate exposure and virtual field experience, preservice teachers cannot be expected to transfer their theoretical knowledge into practice."

Although the Microsoft paper from 2003, "Learning in a Connected World: Harnessing the Potential of Technology", identifies four kinds of 'users' in the networked world/ecosystem of education in the 21st century: the student, the teacher, the parent and the administrator, Davis and her colleagues identified decoupling and reorganisation of these roles into six roles that have been confirmed by other researchers (Davis & Niederhauser 2007; Ferdig et al. 2009; Harms, Niederhauser, Davis, Roblyer, & Gilbert 2006; Hannum, Irvin, Lei, & Farmer 2008). The three key teacher roles that existed within the virtual class environment shown in Figure 1 are course designer, teacher in the eCampus and facilitator in the student's location. They link with roles outside the classroom administrator, technician, and parents or guardians of students. It is the requirement to take care of young adults that ensures this is treated differently from tertiary education and training, where adults are assumed to be able to take care of themselves. Although idealised and originally drawn from case study research into one Virtual Schooling organisation providing supplemental courses for schools in one state in the USA (Iowa Learning Online), these idealised roles in Figure 1 are helpful in clarifying some of the goals in the wide variety of teacher training that has emerged along with the development of eCampuses in schools and colleges.

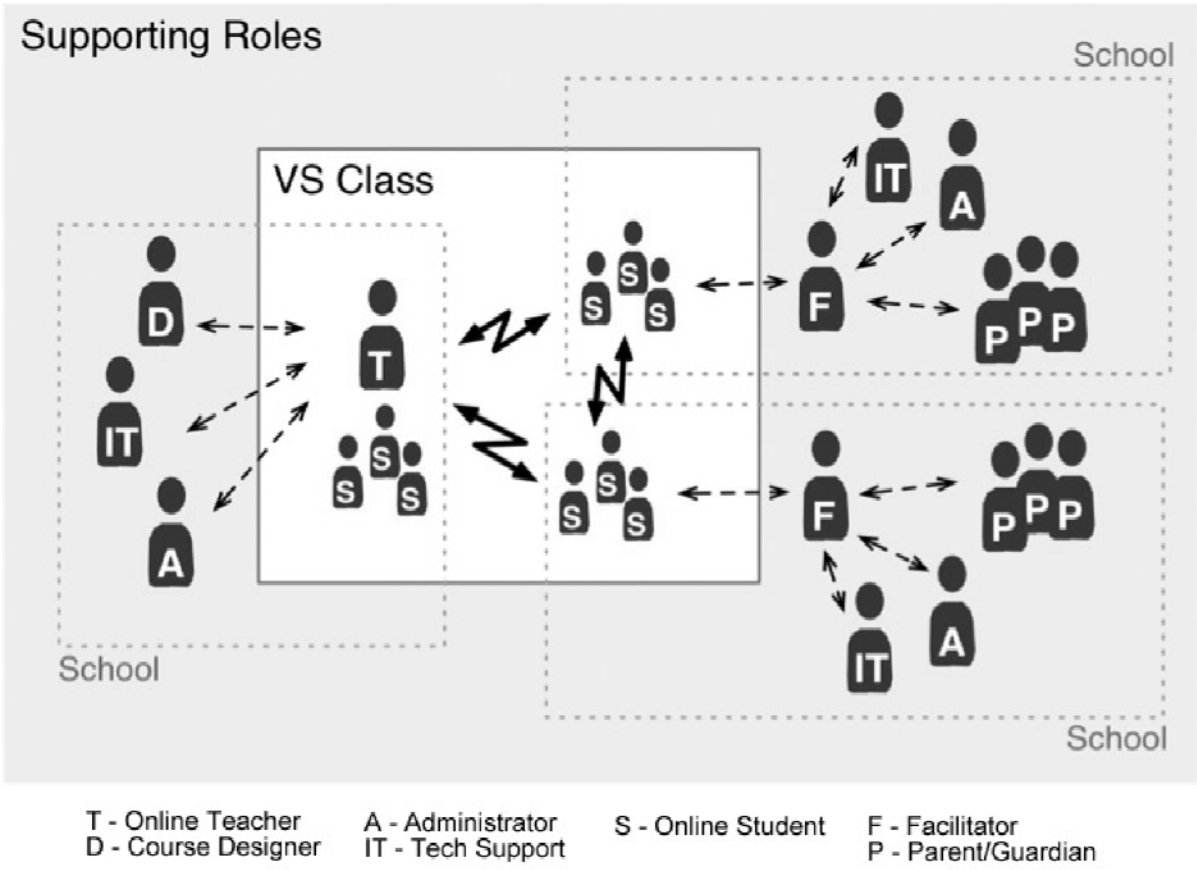

Figure 1. The roles involved in supplemental Virtual Schooling provided into campus-based schools from an eCampus (drawn from Davis 2007)

There have been calls for all preparatory and professional development programmes in the USA to prepare all educational professionals for "these unique learning environments" and Kennedy et al (2013) acknowledge that this has only recently begun to happen. They review the need for the following educational professionals: school librarians, educational technologists/technology specialists, administrators, school psychologists, and school counsellors with links to early literature relating to those roles.

This diversity in eCampus developments for young people aged 14-21 and the decoupling of the class teachers into a range of roles is now used to inform a description of teacher training across the career of a teacher from initial teacher training, to induction into one of the roles on an eCampus, to ongoing professional development that often involves the support of peers in a Community of Practice.

3. Curricula and standards for teacher training

Curricula and related standards for teacher training have evolved for teacher training from several directions and regions.

In Europe the Telematics for Teacher Training (T3) project exhibited and developed 21st century networked practices across a site based campus in seven different counties including research and development of a programme of initial teacher training in each country. Funded by the European Commission within the Telematics Programme T3 was led by Professor Niki Davis in the University of Exeter in the final years of the last century. The production of a core Curriculum for Telematics for Teacher training was an objective within the EU Framework IV research agenda. The curriculum framework was designed to assist policy makers, course developers, teacher trainers and other professionals who are considering the use of Telematics in teacher training. The framework upon which detailed curricula clarifies that teacher training must be embedded into national and local infrastructure, culture and context. It is included here because it may be used to inform eCampus developments too in that it "provides a durable framework with which these curricula can be kept up to date as new developments are forged in Information and Communication Technologies and education." (Davis et al. 1998/9: 6) This core curriculum successfully developed by partners in seven European countries consists of three core sets of considerations (pedagogical; technical; and networking & collaboration) within the contexts of Culture; Managing Change and Global Education.

Research of 26 cases of good practice in ICT in teacher education across Europe, North America and Australia led by Paul Kirschner with funding from a Dutch agency identified six benchmarks of good practice identified for both pre-service and in-service professional development programmes for teacher training (Kirschner & Davis 2003). They advised great caution when applying that to less-developed countries and regions because where there will be additional needs to develop the capacity to support change across their educational systems and to develop an appropriate infrastructure (UNESCO 2002). The six outcome benchmarks are that teachers:

1. are competent personal users of ICT;
2. are competent to make use of ICT as a mindtool;
3. master a range of educational paradigms that make use of ICT;
4. are competent to make use of ICT as a tool for teaching;
5. master a range of assessment paradigms which make use of ICT;
6. understand the policy dimension of the use of ICT for teaching and learning.

These are described in some detail in the paper complemented within the special issue and related report with illustrative case studies. The first four benchmarks were characteristics found in almost all of 26 programmes that the experts in this research project chose as good practice. The final two

aspects were also considered to be important, but were not always present in the cases evaluated. The experts also agreed that, in cases of best practice, the benchmarks would be seen in an environment that not only talks of modern constructivist thinking and pedagogy, but one that also adopts and models those practices. The days of teaching about the use of ICT are over and directed teaching of ICT skills is not recommended." (Kirschner & Davis 2003: 145)

Kennedy and Archumbault (2012: 187) provide a concise overview of standards that inform teacher training curriculum teacher training curricula in the USA: "Although there is an expressed need to prepare teachers for the 21st century, "online" learning is only referenced to require teacher educators to use "multimedia tools, digital resources, and distance learning systems" in their teaching (NCATE, 2008, p. 52). The Teacher Education Accreditation Council (TEAC) also makes no mention of preparing preservice teachers for online teaching (TEAC, 2010). As a result, professional organizations have created standards to guide the quality preparation of teachers to teach online, including the following: International Society for Technology in Education's (ISTE) *National Educational Technology Standards for Teachers* (NETS*T; ISTE, 2008) Southern Regional Education Board's (SREB) *Essential Principles for High-Quality Online Teaching* (SREB, 2006) National Education Association's (NEA) *Guide to Teaching Online Courses* (NEA, 2006) International Association for K-12 Online Learning's (iNACOL) *National Standards for Quality Online Teaching* (iNACOL, 2008) These standards exhibit some overlap while maintaining unique qualities (Kennedy, 2010). Although they do not have jurisdiction over teacher education programs, as do accreditation organizations, they can and do influence policy."

It may be useful to remind readers of the very different and often unexpected instructional factors for teachers working on an eCampus with young adults, particularly students who are required to study by virtue of their age. Cavanagh and Clark (2007: 13-14) provide a useful summary of instructional factors: "In elementary and secondary education, teacher quality is among the most important contributors to student achievement (Darling-Hammond, 2000). Because most K–12 online courses are moderated in part or in full by a teacher, teacher preparation and professional development in online instructional practices are significant elements of effective virtual courses. On the basis that virtual students and practices differ from students and practices in conventional schools, online teachers need to work differently in time and space. They need to be able to engage students using communications technologies such as guided observations, mentoring in K–12 online courses, and design of virtual course materials, which are effective for preparing new teachers to transition to online teaching (Davis & Roblyer, 2005). Teacher professional development may have a positive effect on students' perceptions of cohesiveness in an online course (Hughes, McLeod, Brown, Maeda, & Choi, 2005). Teacher technology skill was identified as a "significant factor affecting pedagogical success" (n.p.) in an evaluation of Australia's Virtual Schooling Service Pilot (Kapitzke & Pendergast, 2005). Teachers who have developed skill in applying reciprocal teaching to Web-based reading were associated with higher levels of reading comprehension and science concept knowledge but lower levels of science declarative knowledge compared to a control group that did not use the Internet (Leu, Castek, Hartman, Coiro, & Henry, 2005). Interaction is at the heart

of online learning. Indeed, it is alternately named as the primary difference between online and face-to-face instruction (Muirhead, 2000), one of the major challenges in online instruction (Murphy & Coffin, 2003), and one of the most important aspects of the online setting (Weiner, 2003). Teachers have reported that their interactions with students, parents, and colleagues were more often focused on teaching and learning than in the traditional setting, but they expressed dissatisfaction with the difficulty of building relationships while managing learning (Muirhead, 2000). In virtual schools, participants seek both deeper and stronger relationships, and they also value frequent and timely responses to questions (Weiner, 2003). Communication with and feedback from instructors was identified as the most valuable aspect of online courses in a study of virtual school students who had Specific Learning Disabilities (SLD) and those with Attention Deficit Hyperactivity Disorder (ADHD) (Smouse, 2005). The ways an online teacher uses interaction tools influences how students encounter and master concepts in a course. “Simultaneous use of a number of tools in combination” enables group collaboration, one-to-one coaching, oral practice, and other strategies that compensate for the lack of visual cues online (Murphy and Coffin, 2003, p. 244).”

To this it is important to add the need for some teachers be trained and collaborate in the design and teach courses that address the needs of diverse exceptional learners. A useful review of those additional challenges is provided in Keeler et al. (2007). Such teachers are involved in course design, leadership of a virtual class and also in the facilitation and on site mentoring of such students. It is useful to note that Gail Wortmann’s exemplary leadership in the set-up and ongoing development of Iowa Learning Online (Davis 2007) progressed in stages that best served exceptionally able students, adjusted more to average students and then developed a course for students with needs for credit recovery.

The following sections provide an overview of relevant practice in teacher training starting with initial teachers training. It should be noted that this practice may not align with the recommended curricula or standards.

4. Initial teacher training

The incidence of preparing teachers during their initial teacher training for working with an eCampus when teaching and/or facilitating learning for students aged between 14 and 21 is rare, but not unknown. The incidence appears to be related to concerns for such students, including the incidence within the public education system. Political initiatives and other contextual factors in national and regional ecologies described elsewhere in the VISCED Handbook indicate that the highest incidence of this is to be expected in the USA with little to be seen elsewhere. Current trends indicate that it is possible that 10% of all high school classes in the USA will be online in five years and 50% by 2020 (Christensen, Horn & Johnston, 2010). For these reasons most of the evidence in this section is drawn from research in the USA.

The earliest research and development was in 2004-2008 was in the *Teacher Education Goes into Virtual Schooling* project led by Iowa State University's (ISU) College of Education Center for Technology in Learning and Teaching (CTLT). Project partners include teacher education programs in the University of Florida (UF), the University of Virginia (UVA), and Graceland University (GU) and a virtual school, Iowa Learning Online. The project goal was to prepare preservice teachers in USA teacher education programs to implement effective Virtual Schooling (VS) curricula in three roles: facilitator, teacher, and/or designer. The three complementary strategies were used to address the overarching goal of building a preservice model for preparing virtual teachers are: (1) identifying and building competencies, (2) developing tools to support virtual teacher education, and (3) creating and scaffolding a national community of VS practice. VS was successfully integrated into initial teacher training. Findings indicated improvements in the quality of teaching and learning through the inclusion of VS in preservice teacher education as well as effectiveness of VS curricula on the preparation of future educators. There were four curriculum innovations:

1. Lab and lecture or seminar within the course that introduces instructional technology (or a VS theme within a methods course)
2. Pre-student teaching early field experience in collaboration with a virtual school and/or a practicum
3. An optional course in flexible and distance learning
4. A VS theme within an optional course in instructional design

The external evaluator M.D. Roblyer concluded: “Results of the summative evaluation, documented in this report, indicate that the TEGIVS Project has met the ambitious challenge of providing an innovative program of resources to help prepare future teachers for virtual schooling. Evaluation data show that all three project objectives have been largely achieved. These data will be an especially helpful guide for future development work as project personnel endeavor to build on this successful beginning and revise materials and strategies based on evaluation findings. As the world's education systems look to a future that is increasingly dependent on distance design and delivery methods, an increasing number of teachers must be prepared who can succeed and help students achieve in the virtual classroom. The foundation provided by this project supplies essential information and direction on how to make teachers ready to enter the "school that technology built" (Davis & Roblyer, 2005).”

Preparing for the facilitator role in ITE

The largest impact of the TEGIVS project was to raise awareness of the importance of the role of the facilitator who was located on the same site as the student and to start to prepare initial teacher education programmes and students for this challenging role which could take many forms. The strategy was to produce and evaluate a workshop and lecture within the course that introduces instructional technology (or a VS theme within a methods course). Resources in the form of a web site that included digital stories of VS was created and remains actively used by a number of programmes in the USA and New Zealand (http://ctlt.iastate.edu/tegivs/curriculum.html).

In common with good practice all four teacher education programs introduced student teachers to information technology along with instructional design and challenged them to develop skills and knowledge for their future educational contexts. In Iowa State University in 2005 the equivalent of one week in a fifteen week course was changed to focused on virtual schooling and related issues in the face-to-face sessions. The topic was introduced in an hour long lecture and that week's two hour lab applied the relevant lab, which ended with a presentation by small groups of 2-4 students followed by a plenary discussion reviewing the benefits and challenges of virtual schooling. The students were also required to write a reflection on virtual schooling and elementary students had the option of developing this work into one of the artifacts in a required electronic portfolio. The innovation was refined in 2006 with a second lab tool more suitable for elementary students.

The approach was then adapted by the collaborating programmes. In the University of Virginia although the grouping of the introductory courses was according to content and phase even more tightly than in ISU, the course had some similarity to a methods course in which TEGIVS elementary and secondary labs were both the piloted successfully. In the elementary pilot, the TEGIVS elementary lab tool was adopted by two elementary sections (total of 33 undergraduates plus 5 graduates) by moving the entire class session online and using existing discussion tool and class Blogs. The class was directed to use the TEGIVS Elementary Lab (http://ctlt.iastate.edu/tegivs/VSLab/ElementaryVersion/index.html), to discuss the two scenarios plus a requirement to reflect overall impressions of VS in the student's own Blog.

The University of Florida course had the lecture portion online and then students used the secondary lab tool in their on-site lab class starting in summer 2005. This course required least adaptation and professional development. Given the relevance to the online mode of instruction, the virtual schooling session was moved earlier in the semester over time. Graceland University did not have an introductory course, so secondary methods course was chosen to introduce virtual schooling as a theme along with other education issues. VS was introduced early in the course with readings that raised issues relevant to many aspects of twenty-first century schooling. Towards the end of the course students undertook the secondary lab to promote deeper reflection on classroom management. Subsequent offerings added a VS teacher as a virtual visiting speaker and an element of assessment on VS.

Field experience for student teachers on an eCampus

The most challenging aspect of initial teacher training is the field experience. Compton and Davis (2010) explain: "Traditionally, teacher education has placed a high value on various forms of supervised field experience. These experiences are interspersed between blocks of time devoted to theory-based courses and allow teacher candidates to contextualize their theory learning and "observe [good practice] and work with real students, teachers, and curriculum in natural settings" (Huling, 1998, p. 2). Huling likened field experience in teacher preparation to internships and residencies provided to medical students. Field experience is part of the learning sequence that scaffolds the transition to a teaching role and provides the opportunity to link theory and practice (McIntyre, Byrd, & Foxx, 1996). It involves the initial observation of an experienced and competent teacher role model followed by post observation discussion to clarify and usually expand upon the teacher candidate's observation insights. When part of a practicum, this discussion will often be followed by cooperative planning involving a single teacher candidate and the associate (cooperating) teacher."

However, where there is no class to visit on a campus, the field experience must be adapted. Compton and Davis continue: "Preservice teachers who may have had negative or poor experiences with online or distance learning in the past would certainly have preconceptions that need to be addressed through field experiences specifically for VS. Moreover, changes in roles in virtual classrooms, such as the complementary roles of the VS teacher and the VS site facilitators cannot be observed in traditional field experiences. Also, without the teacher and students in one traditional classroom setting, assigning teacher candidates to a brick-and-mortar school for a field experience emphasizing VS would be pointless. Therefore, an alternative form of field experience is required to capture the reality of VS. In their guide to teaching online courses, the NEA (n.d.) suggested that preservice online "student teaching" might include the following:

- Research on online instruction in the preservice teacher's academic discipline and on the learning and behavioral characteristics of the grade level of the students the novice teacher will instruct;
- Experience with and research into different delivery platforms, and examination of the pros and cons of each;
- Experience with self-paced "demos" of courses;
- Auditing professional development training for online instructors, and
- Student-teaching opportunities in online classes – a 15-week commitment in which a student learns course content, is mentored by an experienced online instructor, and, with constant supervision by a "master teacher" of record, has the opportunity to "practice teach" online. (p. 13)"

Compton and Davis (2010) provide a detailed case study of this, the first known field experience to be researched in initial teacher training in the world, including a detailed curriculum and narrated tour through the online course used by the teacher trainees to prepare for and accompany the experience. The findings are summarized as follows: "five key elements that were seen as contributive to the success of this pilot virtual field experience. Offering the field experience virtually not only allowed the teacher candidates to observe the teaching in its real context, it provided them with an online experience which the NEA (n.d.) deemed as important for teacher preparation of the 21st century. Second, the inclusion of external and internal methods of information gathering helped to facilitate the teacher candidates' inquiry of VS, resulting in increased awareness and professional growth. The third and fourth elements stressed the importance of providing a range of learning activities that are self-paced, guided or structured, and hands-on, so teacher candidates could focus on critical aspects of VS and interpret their observations accordingly. Finally, the inclusion of an onsite observation provided a more complete overview of complementary roles played by the VS site facilitator and the VS student in addition to those played by the VS teacher.

In addition to these five key elements, challenges and suggestions were provided to improve future offerings of this virtual field experience. Two key challenges were the difficulties in scheduling and the limited allotted field experience credit hours. Because some activities had to be conducted synchronously, the teacher candidates had to find timeslots amidst their regular weekly activities to coincide with the VS teacher's schedule, which proved difficult. Funding was required to pay for the ICN room for observation purposes. Also, due to the limited number of hours allotted for this virtual field experience, the teacher candidates were able to complete only a minimal number of learning activities, particularly in [version 2], which did not allow the teacher candidates the opportunity for an onsite visit. This onsite visit proved to be a valuable opportunity to expose teacher candidates to other people in the VS community. Naturally, two suggestions to overcome these challenges are to ensure adequate funding and more contact hours, so teacher candidates can receive adequate learning opportunities."

One of these Florida programmes had evolved out of the national initiative "Teacher Education Goes into Virtual Schooling" (TEGIVS), which offered the first field experience in initial teacher education from Iowa State University into Iowa Learning Online that was followed a year later by a partner programme in the University of Florida whose student gained experience in Florida Virtual School (Davis & Ferdig 2009). In fact, due to the early stage of development of virtual schools when TEGIVS was designed, it was only planned to develop curriculum resources and practices (Davis & Roblyer 2010). The field experience was the inspired strategy of ISU's innovative director of field experience who was keen to reach out and place students in rural schools in that largely rural state. Compton's doctoral work provides comprehensive research into that challenging innovation (Compton and Davis 2010; Compton, Davis & Mackey 2009). It is also interesting to note that research of the experience of three preservice teachers in a virtual school (under review) called for a number of the component s in the TEGIVS designed field experience (Compton, Davis & Mackey 2009; Compton & Davis 2010), including the induction phase in an online environment to acclimatise students teachers

to learning on a similar eCampus with relevant readings to increase their knowledge of the phenomenon before they were inducted into a specific virtual school.

More recently in 2011, a national survey targeting initial teacher education programmes' efforts in the USA showed that only 1.3% of responding teacher education programmes were offering a field experiences on an eCampus, while 13% were currently planning to create such an experience and "approximately 50% thought that they should start offering preservice teachers field experiences in virtual schools." Kennedy & Archambault, 2012: 195).

Seven models were described by Kennedy and Archambault (2012: 190-193), most of which involved relatively small numbers of student teachers who gained experience on a virtual campus of a school or college:

"Florida 1. Preservice teachers complete 14 weeks of internship.cThe cooperating teacher must have at least 3 years of teaching experience and state-documented clinical education training. The preservice teachers must pass all general and core courses with a grade of "C" or above to participate in the field experience. They must also have demonstrated knowledge of Florida Educator Accomplished Practices at "Competent" or above. Finally, preservice teachers are required to be fingerprinted, approved by the advisor of the practicum, assigned a coordinator, and have a completed application for the internship.

Florida 2. Florida 2's preservice teachers are placed with cooperating teachers at a state-level virtual school. The experiences are 4 weeks in length and are associated with a graduate-level, university-based course. The structure of the experience is mostly determined by the virtual school with a small amount of input from the university. The preservice teachers and cooperating teachers meet face-to-face for an orientation before the practicum starts. Preservice teachers must be specializing in educational technology to take part in the VSFE, and they shadow the cooperating teacher to learn about the content management system (CMS). As with traditional placements, these students are required to reflect on their experiences throughout the practicum. The cooperating teacher is required to have clinical education training to serve as a mentor.

Florida 3. Like Florida 2, Florida 3 partners with a statelevel virtual school. The preservice teachers choose a juniorlevel or senior-level VSFE. If they choose junior level, they complete 7 weeks in brick-and-mortar (traditional, face-toface) schools and the other 7 weeks in a virtual school. Senior interns complete a 16-week internship in a virtual school. Cooperating teachers at the state-led virtual school are required to have knowledge related to their content area, online learning, as well as academic, technological, and socioemotional skills. This model provides preservice teacher training and professional development related to K-12 online learning. The preservice teachers reflect on their experience throughout the semester and complete specific coursework related to K-12 online learning. They are also tracked by log-in data and observed by their university coordinator.

Florida 4. For Florida 4, not all students in the college of education are able to participate in VSFEs. Over the last 2 years, Florida 4 has been piloting a program with physical education (PE) preservice teachers who are assigned to a VSFE for 7 weeks, while they assist in teaching high school students' required PE health and fitness courses. The preservice teachers assist with the development of online content, create lesson activities, assess student learning, and communicate with parents and

students. The virtual school identifies cooperating teachers to participate, and the university instructor pairs the cooperating teacher with preservice teachers who are required to document their experiences via ongoing reflections. In addition, through this model, a small group of school counselors learn about K-12 online learning through required course training modules.

South Dakota 1. South Dakota 1's program partners with a school that is not completely virtual. The school offers individual online courses through a statewide network to schools that do not have a family and consumer sciences program. Typically, one online course is offered, and preservice teachers who are student teaching in that school teach the course to students at other sites using a Web-based course platform. Preservice teachers who are given this placement must have some technological skills for setting up the course feed. Preservice teachers observe cooperating teachers at the school and journal their reflections during the practicum. This program reported that their state does have a virtual high school, but their preservice teachers have not worked with it yet. The program faculty is currently considering the inclusion of online course development for preservice teachers.

South Dakota 2. South Dakota 2's preservice teachers assist in teaching state and private vendor courses that are offered online. These experiences are optional to the teacher education candidate. Through their coursework, they are given opportunities to volunteer to assist in the K-12 online learning courses, and must log their activity for credit."

5. Graduate and postgraduate courses

In Europe, while it might be expected that the UK Open University would offer the most relevant teacher training, the UK OU's mission targets adults and therefore teacher training for working on an eCampus is related to its adult students, although limited support for teachers of students aged 14-21 is provided by some short courses offered through the VIDAL project led by Twining (personal communication 2012). The most relevant programme is the Masters programme in Online and Distance Education, although that has no focus on the school sector. Another relevant programme is the master programme (MIL) in ICT and Learning, but it should be noted that few students are school teachers. MIL is an online master programme on ICT and learning offered by five leading Danish Universities (Aarhus University, Aalborg University, Roskilde University Center, Copenhagen Business School, The Danish School of Education (Aarhus University). It is contrasted with another masters programme in the interim report (Sorensen at al. 2011, section 6.2).

There are also shorter certificate programmes. A fairly typical example of a short quality course in European is the LeTTOL course that has been offered by Sheffield College since 1997. In 2003 David Jenkins Blogged that "the Learning to Teach On-Line team for winning a National Training Award … Having done the course myself in 1998, and worked with some of its main architects since before then, the LeTTOL team commissioned me to write their application for the award. This course is delivered online and so the participants are able to experience first-hand what it's like to be a student on an online course and to develop empathy for distant learners. Students learn how to communicate online and manage forums, "with an emphasis on making students feel that they

belong to a vibrant community which rewards online activity. To tackle the problem of retention, there has to be a particular emphasis on maintaining student motivation, promoting interactions and providing explicit instructions to guide the studying and learning process, taking account of the fact that the kind of instant clarification available to face-to-face students may not be available. Formative feedback is also critical to reassure students that they are on the right track. The web site advertisement is shown in Figure 2.

> LeTTOL is an accredited online distance education course aimed at teachers, lecturers, trainers and content developers who wish to transfer their existing skills to an online environment.
>
> At the end of the course you will be able to:
>
> - recognise how generic tutoring skills translate to an online environment
> - understand the principles of designing activities for online delivery
> - understand how available technology can be utilised to support online learning
> - recognise the impact that society has on online learning.
>
> LeTTOL involves approximately five hours of study per week over a period of 11 weeks. Holidays, bridging weeks and portfolio submission can bring the total time close to 16 weeks. In addition, you may spend a considerable period of time working round the course material. All course activities, tutor support, peer interaction and assessment take place online.
>
> Over 3,000 professionals from across the world have taken our LeTTOL course.
>
> LeTTOL comprises four units, each of which is sub-divided into sections:
>
> - **Unit 1** - Getting Started - Introduction, Collaboration and Moodle
> - **Unit 2** - Learning Online - Online Resources in a Changing World
> - **Unit 3** - Learning Management - Issues, Learner Support, the Role of the Tutor and Assessment
> - **Unit 4** - Online Design and Delivery - Designing for the Internet
>
> Each learner is allocated to a cohort of learners with a single tutor throughout the course. During the first unit the cohort is divided into learning sets of around six learners who then work together for the rest of the course. You progress by reading the web-based course materials, completing individual activities and taking part in collaborative activities. (see http://www.online.sheffcol.ac.uk/index.cfm?ParentID=7f6d8400-59f1-45ae-b10d-03b0b3f97d8b)

Figure 2. The web site advertisement for the Learning to Teach On-Line (LeTTOL) certificate programme in November 2012.

In the USA there are hundreds of programmes that train teachers for teaching on an eCampus, including the University of Maryland College programme that all faculty are required to earn before teaching online and at a distance. However, only some of these programmes prepare teachers for students aged 14-21. In addition there are many informal and short course certificates. Barbour reviewed the most relevant to this report “university certificate programs that had a focus on or a track for K-12 online learning” in his Blog and the following list provides links to them:

- Arizona State University
- Boise State University
- Georgia Southern University

- Georgia State University
- University of California-Irvine
- University of Central Florida
- University of Florida
- University of Wisconsin-Stout
- Valdosta State University
- Virtual High School Inc. Partnerships
- Wayne State University

According to Barbour (2011), "Some are run by universities, others are run by K-12 programs themselves in partnership with a university. Some lead to a certificate, some to an endorsement to one's teacher certification, some offer both. Some are three courses, some four and some five (and it is important to pay attention to credit hours as well, as some universities have all three credit hour courses and others have two, three, and four credit hour courses). Some offer a field experience, others don't. Some programs are specifically focused on K-12, while others simply have a track for those interested in K-12." This provides choice to the potential student.

There is also choice in New Zealand where several institutions offer relevant courses and/or programmes with the most relevant being the Open Polytechnic, Massey University and the University of Canterbury. The University of Canterbury course in best practices in online learning and teaching is one of the best described (see Dabner, Davis & Zaka 2012) and includes teachers working on eCampus and also introducing blended learning in campus-based schools. It is also interesting to note that the adopted text book "Essential elements. Prepare design and teach your online course", which uses the Concord Consortium e-Learning model that was further developed for VHS (Elbaum, McIntyre & Smith 2002).

The following long quote from Dabner, Davis & Zaka (2012) provides a fairly comprehensive description and more detail may be found online in that open access journal, including a digital tour of the course in the LMS by the lead course designer (Dabner): "The course described is an optional course within the University of Canterbury Masters of Education degree program. It may also be studied as one of the four courses within our Postgraduate Diploma of Education (e-learning and digital technologies) or as one of two optional courses that comprise our Postgraduate Certificate of Education. Finally, students who opt to take it without any other courses may request a Certificate of Completion without enrolling in any program. A previous, more limited version of the course, was offered at the graduate level in the same institution. The second author previously developed courses with a similar project-based approach in the UK and in the USA (Davis & Nilakanta, 2003).

The approaches of all four courses within our Postgraduate Diploma of Education (e-learning and digital technologies) are similar. All are offered without the need to attend campus, and the central virtual classroom is in the university's Learning Management System, which is currently a version of Moodle. All courses are carefully designed to develop a community of learners (Correia & Davis,

2008) and to enable participants to engage simultaneously with their professional community of practice in their workplace.

Earlier research into the graduate program by colleagues Julie Mackey (2009) and Donna Morrow (Morrow & Bagnall, 2010) provided a range of evidence of the benefits of this approach for both the students and their school or other organization. Morrow and Bagnall (2010) provided evidence of the importance of the value of local communities and student choice. Mackey (2009) provided evidence that the blending of teachers' workspaces and other communities with their online learning experiences increases the impact of professional development. …

The Design

The online classroom for each offering of this course, as cognitive instructional design methods suggest, is carefully designed so that the students will be able to relate their learning to their existing schema. It is structured into sections that relate to the elements of online learning (see Figure 1). Keeping information in clearly identified, brief, easily accessible chunks, presenting some information as steps to take in their planning and learning, and utilizing shared reflective journals improves assimilation, application, and reflective practice. The course environment provides rich, responsive information and material related to the students' tasks supported with discussions of current research, relevant literature (e.g., Kerhwald, 2010; Ko & Rossen, 2001), and emergent practice shared by both the teacher and students."

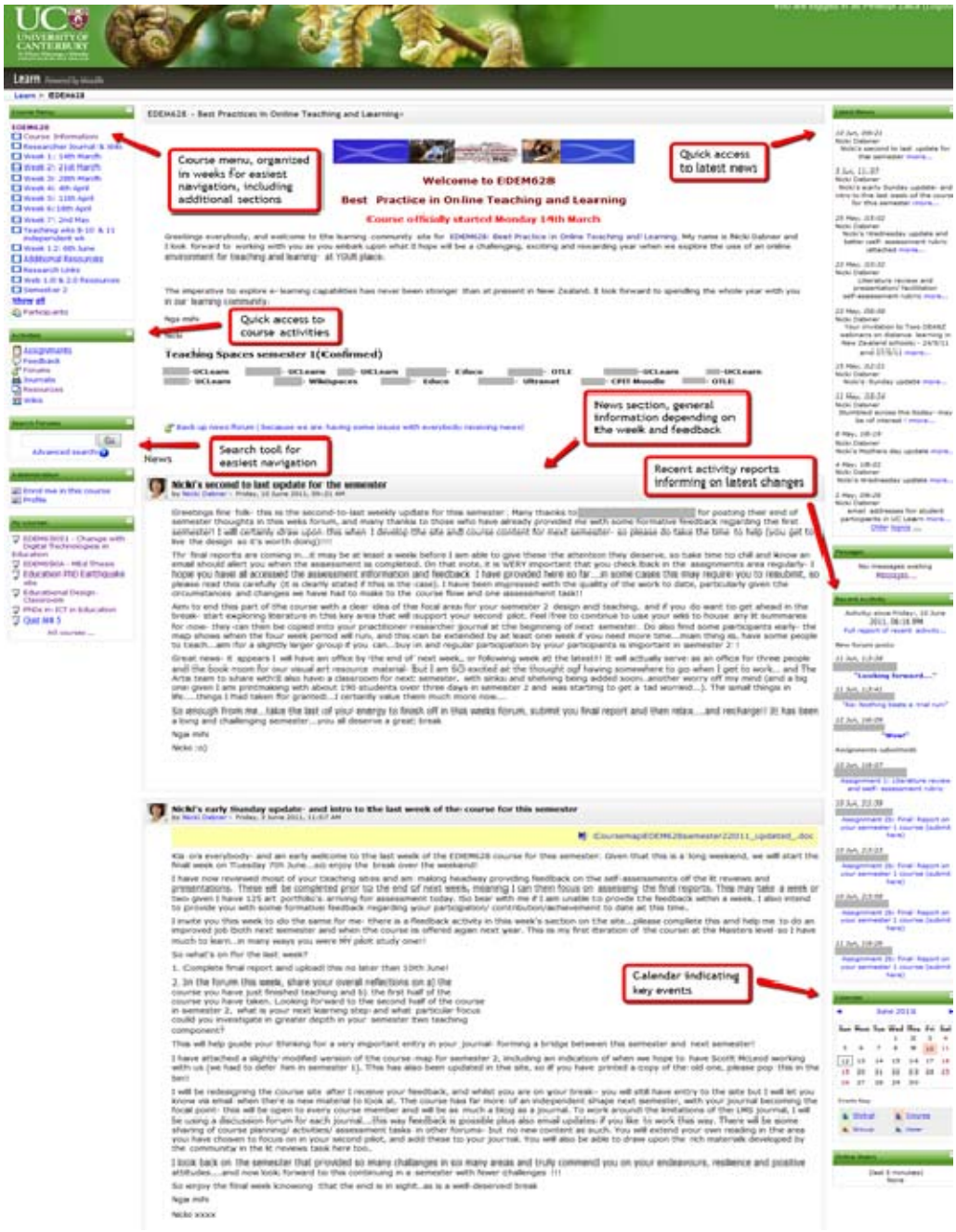

Figure 3. The home page of the course in the Learning Management System in 2011 (Dabner, Davis & Zaka 2012).

An authentic problem solving context in which constructivist learning can take place is a key component of the course activities and assessment. Students are facilitated to design and create their own online learning space for two courses that they pilot with their own students. This is the problem to be solved. To portray the task accurately, the learning has been presented using our university LMS, and then the same tools (and additional multimedia objects providing course design

support) were made available to each student by giving them a Moodle site of their own for their own courses.

Some students negotiate to create their courses in their own LMS, which is encouraged where adequate support is available. Some students choose to work on a course that they have taught and are supported to improve it and to undertake their first action research in this field; others take the opportunity to develop new courses and material for their present students. Students who are not currently teaching are supported to design courses for their future context or to work jointly on the design and teaching with a peer.

The course has been designed to model an approach that includes the formation of an online community of learners who establish an online social presence (Kerhwald, 2010), with the objective to become tightly knit by the end of the course. Through the LMS the teacher gives leadership and support, facilitates some discussions, makes suggestions, and encourages, critiques, and provides further relevant resources to support emergent themes and issues.

Other pedagogies for online learning are illustrated with accompanying pedagogical reasoning to give students the opportunity to grasp the process behind the learning and increase their experience of online learning and practical solutions to some of the problems they might encounter. The creation of a community of learners provides the opportunity to work with others in solving problems and is fostered through the conversation and collaboration tools, including online discussion forums and Web 2.0 tools.

Table 1 presents an overview of the course content and design (see also Presentation 1 (PowerPoint download), a virtual tour of one semester of this yearlong course). The academic year in New Zealand normally consists of two semesters of 12-14 weeks, starting in February and ending in October. The first semester provides students with an overview and lived experience of learning online, including establishing their social presence and the community of learners. Each student conducts a small literature review, facilitates a discussion forum as part of the first assignment, and undertakes an institutional review in their own professional context before creating their first small pilot course and teaching it.

Table 1. An Overview of the Course Content and Its Design

Diverse Learning Communities • K-12 teachers • Tertiary educators • Community-based educators • Professional development facilitators **Key Teaching and Learning Strategies**	**Course Content** (2 x 12 week semesters) • Introduction to online and blended learning • Review (and student presentation) of research/ literature in self-selected areas of interest • Investigating Institutional readiness for

• Authentic learning and teaching contexts • Research-informed practice and reflection • Collaboration • Community of practice (including invited experts) • Constructivist learning • Use of web 2.0 tools • Modelling by lecturer/peers • Peer appraisal • Authentic assessment: including formative and summative feedback	the adoption of online/blended learning • Virtual schooling • Learning management systems - site and content design/development • Conceptual design, assessment and evaluation • The lead learner (teacher) in an online environment • Student success and engagement in an online environment • Alternative lenses on online learning (e.g. MOOCS, open courseware, expert capture, RSS feeds)
Application • Student review of organization's readiness for online teaching/ learning • Teaching site development (in Moodle or own institutions LMS/web-based environment) • 2 x pilot course developments: conceptual design, implementation, evaluation and reflection • Collaborative developments: Shared literature Wiki, presentation & repository/ Web 2.0 tools repository	**Assessment Dimensions** • Depth and breadth of knowledge/understanding • Active involvement in research and research- informed praxis • Engagement in reflective practice • Communicative and collaborative skills • Engagement in critique and debate

The second semester is mainly project based, with the goal of creating and teaching a more comprehensive second pilot course, enhanced by their review of the first pilot and additional relevant literature. The schedule of the first semester had to be adjusted to adapt for the earthquake in February 2011 (Dabner, 2012, provides and account of the immediate impact of the earthquake on the University and its use of Facebook in addition to the LMS and university webpages)." (Dabner, Davis & Zaka 2012)

6. 'On the job' teacher training

The majority of teacher training is designed and offered by the organisations with the eCampus that includes offers courses to students aged 14-21. All institutions that have passed the early set-up phase and move to an expansion phase must induct new teachers, including teachers that are already licensed to teach student in the compulsory education sector.

Only a few organisations began with a mission and expertise that included teacher training, most notably the Virtual High School. VHS partners developed a certificate (TLC) programme that all VHS teachers must complete and the early version scaffolded the creation of the early VHS courses. The team providing TLC collaborated to produce a text book on their pedagogy (Elbuam, McIntyre & Smith 2002) that has also been adopted elsewhere, including the New Zealand course described above (Dabner, Davis & Zaka 2012).

The most comprehensive account is provided by Lowes (2007: 166-171) who provides contrasting cases of the process of professional development in four virtual schools in the USA: "In this section, we will briefly describe how the distinctions outlined earlier—between virtual courses and virtual classrooms, and between professionally developed and teacher-adapted courses play out in specific schools that offer virtual schooling. Florida Virtual School and Virtual High School are the oldest and most highly developed examples of schools that rely on virtual courses (FLVS) and virtual classrooms (VHS), with the more recent Michigan Virtual School closer to the virtual course model and Louisiana Virtual School closer to the virtual classroom model. FLVS is also the mostly highly developed example of professionalized course development, while VHS is the most highly developed example of teacher-led course development. The professional development experiences at each school differ in structure, length, and content, depending in part (but only in part) on whether the schooling takes place through virtual courses or in virtual classrooms. Thus, VHS and LVS teachers, who work in virtual classrooms and adapt courses, go through long pre-teaching processes that focus on learning the course content and developing strategies for course facilitation. FLVS teachers, on the other hand, handle many students one-on-one in virtual courses, spending less time beforehand on the course content. MVS falls in between. The descriptions, although highly condensed, are designed to give a sense of the variety and complexity of the schools and of their approaches to professional development.

Schools Offering Virtual Courses

"Florida Virtual School was founded in 1997 and is the second largest virtual school in the United States. Utah's Electronic High School is the largest, with about 35,000 students in 2005, but its courses are more like traditional correspondence courses. In discussing virtual schooling, where one student may take one or more courses online, there is a distinction between course registrations and number of students. Course registrations seem the more comparable number, and FLVS had just over 33,000 course registrations from summer 2004 through spring 2005 (Watson, 2005), see www.flvs.net/educators/fact_sheet.php). It offers more than 80 courses taught by 174 full-time and 106 adjunct faculty, a larger proportion of full time to part time than most virtual schools. FLVS was founded in order to offer a virtual alternative to students in Orange County and Alachua County, Florida, school districts, where the student population was expanding faster than buildings could be built (Clark, 2001). However, it quickly attracted homeschoolers, migrant workers, and students from other districts. FLVS emphasizes one-on-one teacher–student communication as being at the heart of its educational experience, with communication mostly by telephone and e-mail (Friend & Johnston, 2005). A full-time FLVS teacher will handle approximately 200 students to course completion, and all of them may be on different schedules, either because of rolling enrollments or because students can set their own pace as they go through a course. To manage this

variation, FLVS has developed "pace charts," which allow students to choose one of three paces: traditional, extended, or accelerated. Teachers can further adapt these to students' needs. Not surprisingly, to manage such a large number of teachers and rapidly changing roster of students, FLVS has developed comprehensive management and tracking systems. When FLVS started, teachers created its courses, but they are now developed by multi-role teams that include subject matter experts, curriculum specialists, instructional designers, and project managers, with separate teams for creating, modifying, and totally revising courses. Teachers cannot change the course content, but they can individualize in small ways, for instance, by adding chats, topical discussions, announcements, and so forth. Professional development at FLVS was originally entirely face-to-face at FLVS headquarters. This in-person element has been maintained, although in an abbreviated form, while an online component has been added. FLVS has recently begun to chunk the material to be covered, delivering it on an as-needed basis rather than all at once. For example, teachers learn how to register students early on but do not learn how to submit grades until later. Before they begin teaching, new teachers take a quick walk-through of the course with the help of a content specialist.

Not surprisingly, given the number of students that FLVS teachers work with, considerable professional development time is spent on course management and administrative systems, in addition to strategies for effective teaching. FLVS also has a mentoring system that lasts an entire year. The mentor teacher—a veteran instructor who has proved to be highly successful teaching online—both supervises and advises (by telephone and e-mail), frequently at first and then at longer intervals. In addition, mentors meet together weekly as a team. FLVS has a highly developed system for monitoring teachers, including "observations" of online activities, reviews of teacher progress reports, and checks of phone logs (Watson, 2005). Michigan Virtual School has its roots in a long tradition of distance education in the state. In its current manifestation, MVS first offered courses in fall 2000 (Clark, 2001) and has since expanded rapidly, to approximately 6,000 semester course registrations from summer 2004 through spring 2005 (Watson, 2005). Most of the approximately 80 MVS teachers teach only one course and also teach either full or part time in site-based schools. Like FLVS, MVS's approximately 100 courses (plus another 100 exam-review courses) are mostly self-paced and instructorguided, with teachers interacting with students one-on-one. MVS originally bought its courses from outside vendors but is now developing its own, using teams that include the department chair, an instructional manager, and an instructional designer. MVS's training for teachers originated in an online course for higher education faculty, in this case a 7-week course developed to train faculty to teach online. Like FLVS, MVS has a face-to-face component to its professional development: a year-end meeting that is part professional development, part planning, and part building communities of practice. MVS has a mentoring system that originally relied on experienced teachers acting as mentors to new teachers, "sitting in" on their courses and being available for consultation. These have recently been replaced by department chairs."

Schools Built around Virtual Classrooms

Louisiana Virtual School, like Michigan Virtual School, has its roots in earlier incarnations of distance education, at first by satellite and then via tele-learning through the state's Distance Learning Network. LVS first offered courses through a private boarding school, the Louisiana School for Mathematics, Science, and the Arts, whose teachers developed and taught a series of synchronous distance-learning courses. In 2000, the format was converted to online, although there are still courses offered through a satellite link. LVS's origins are thus in virtual classrooms, and these

continue today. As with VHS, LVS students are required to interact with each other. Since 2000, enrollment has grown rapidly, and LVS had approximately 2,500 course registrations, in 32 courses, in the 2004–05 academic year (Watson, 2005). Most of LVS's approximately 40 teachers teach online part time. Teams develop LVS courses in-house, and teachers are allowed to add to, but not subtract from, the courses as they teach them. To deal with its rapid expansion, LVS developed a structured five-phase professional development program. LVS decided not to develop its own professional development course for new teachers but instead enrolled prospective instructors in an existing 6-week course offered through Concord Consortium and tailored to LVS needs. After taking the course, the prospective teacher spends a semester as a teaching assistant for an experienced instructor, who plays the role of mentor. This is followed by an induction year, during which the new teacher is allowed to teach one course. LVS also requires all its teachers to participate in online workshops throughout the school year and attend a year-end, face-to-face workshop—3 days in the past, reduced to 1 in 2005 when students displaced by Hurricane Katrina needed the space for summer school."

Virtual High School is the oldest of the four schools discussed here and is unique in that it is the only virtual school that is not state-focused, drawing its teachers and students from across the nation as well as from other countries. VHS was founded in 1996 as the result of a 5-year U.S. Department of Education Technology Innovation Challenge Grant. The grant was awarded to the Hudson, Massachusetts, Public Schools in partnership with the Concord Consortium, an educational research and development organization. In 2001, after the grant ended, it became a nonprofit organization, headquartered in Maynard, Massachusetts. VHS had approximately 6,000 course registrations from summer 2004 through spring 2005, with 260 teachers offering 140 courses (Watson, 2005). This increased to 237 courses and 7,500 enrollments in 2005–06, largely as the result of a Department of Education grant to develop an Online AP Academy (Virtual High School Network, 2006). VHS has a unique cooperative structure: a school that releases a teacher to teach a VHS course is allocated 25 seats for its students in other VHS courses. Because of this arrangement, almost all VHS teachers teach virtual and face-to-face classrooms concurrently. All VHS courses are developed by the teachers who teach them. Those who teach a previously developed course are required to adapt it. They can change the readings, the assignments, and the assessments, although the course must still meet the applicable national standards. VHS teachers teach in virtual classrooms. In other words, although the courses are asynchronous and accessible 24/7, students who enroll in a class follow a weekly schedule of readings, activities, and assignments, and they are expected to collaborate and communicate with each other frequently throughout the week.

When Concord Consortium received the Technology Innovation Challenge Grant to create a virtual high school, it had been offering K–12 classroom teachers, through an earlier grant, online professional development courses on developing inquiry-based instruction in math, science, and technology. The experience gained in developing and facilitating these courses, which relied heavily on the exchange of ideas in discussion forums, provided the basis for VHS's virtual classroom model, as well as for its first professional development course, titled Teachers Learning Conference (TLC). In addition, because VHS teachers come from, and work for, many different districts and schools, VHS had to develop a teacher preparation process which would ensure that all its courses and teachers met the same high standards. TLC is a 22-week (shortened from 26 weeks) online course in which teachers learn about and experience online pedagogy as they build courses they will teach. They can receive up to 12 graduate credits for completing the course. A shorter (10 weeks,

shortened from 12 weeks) course, Netcourse Instructional Methodologies (NIM), was developed for teachers to learn online pedagogy as they adapt existing courses. During TLC, NIM, and their first semester teaching, new VHS teachers are carefully mentored and supervised by experienced VHS teachers. VHS is the most explicit of the four schools discussed here in terms of its focus on transferring a student-centered, constructivist pedagogy from face-to-face instruction to the virtual classroom, introducing teachers to the principles of "backwards design" (Wiggins & McTighe, 1998) and emphasizing problem-based learning, peer review, and the use of rubrics. For many VHS teachers, this is their first exposure to this approach to curriculum development (Lowes, 2005)."

Further detail is provided on FLVS approach to teacher induction and ongoing support by Reeves et al. (2007: 89) in their chapter on FLVS approach to teaching and learning mathematics online from an administrator's perspective: "The first line of teacher support begins with face-to-face new-teacher training. Teachers are asked to complete an online training course focusing on the art of online teaching in preparation for the first day of training. At the face-to-face training, teachers are introduced to the different management systems and how courses are structured and assignments are graded. Most important, a student-centered culture and sense of community is established. The second line of support is the mentoring program. Every teacher, regardless of the length of teaching experience, is assigned a mentor for 1 year. The mentor provides personalized training and support that is a phone call or instant message away. The role of the mentor is to meet new instructors at their proficiency level and groom them until they are comfortable with the course curriculum and all of the communication techniques that are available. The mentor invites the mentee into his or her welcome calls and Elluminate sessions and shares written weekly updates and sample feedback. At Florida Virtual School students, teachers, and administrators do not work in isolation but are a part of a collaborative learning community. The third area of support is that of the subject area department. Algebra and geometry teachers collaborate on a monthly basis about best practices and share effective communication strategies. Ongoing course enhancements require the novice as well as the seasoned online instructor to collaborate continuously. Keeping curriculum fresh and up-to-date is the job of the curriculum specialists. If a teacher sees an area that could be enhanced, improved, or corrected, FLVS has a process in place to handle course adjustments in a timely and efficient manner. Having a direct impact on curriculum is one way to keep teachers closely connected to the curriculum.

The fourth line of support is that of the instructional leader. The instructional leader has the responsibility of assuring that exceptional curriculum delivery, feedback, and customer service are consistent throughout each course. The instructional leader performs classroom walkthroughs, which consist of reviewing and providing feedback for teachers on their forms of communication. A teacher's announcement page, grade book, e-mail, whiteboard sessions, and discussion areas are reviewed on a regular basis. Ensuring that work is being graded in a timely manner (FLVS has a policy of 24-hour return for work submitted) and that monthly phone calls are being made are two areas of oversight for the instructional leader."

Trends were identified in 2007 by Lowe were outsourcing of the professional development, noting the example of TLC course that developed with VHS was revised and adapted by the Concord Consortium to serve the needs of Louisiana Virtual School. In addition FVS has always included training with the sale of its course licensing package. Many teaching teams working through an eCampus have also developed arrange of strategies for 'just in time' training, and some schools vision includes Communities of Practice ongoing mentoring, appraisal and leadership development, which is part of the best practice recommendations reviewed earlier. For example, the professional development model for VHS takes teachers through a process of self evaluation, peer mentoring and formal evaluation (Pape, Adams & Ribiero 2005), and long term community support is shared in an online environment called Community of Virtual Educators (COVE) that has become a blend of LMS and synchronous conferencing in platforms (such as Elluminate and Adobe Connect) plus optional site based meetings annually. VISCED's Italian pilot also developed an online community of practice in its professional development model.

7. Teacher training in the VISCED pilot

Given that the VISCED pilots were an early step in eCampus practices it is not unexpected to find teacher training was limited to induction and ongoing communities of practice within these organisations. The same was true for the early stages of development in the USA, except when the establishment of an eCampus included leaders with expertise in teacher training and knowledge of its link with quality and outcomes for students. For example, the Virtual High School was developed on top of the Concord Consortium's research and development of networked professional development in science teaching (Zucker & Kosma 2003). As noted in the VISCED Handbook growth of this is not foreseen in Europe because student numbers are steady and there appears to be low staff turnover for most of the organisations with an eCampus.

Only the Italian pilot project included teacher training and its approach is now described. In Italy, VISCED partnership programme with the Network for School Innovation (NSI) piloted blended online learning, teaching and teacher training with teachers in 11 schools during the 2011–12 school year with support from the Lambrakis Foundation, in scientific collaboration with Professor Kalliopi Kounenou of ASPAITE (Graduate School of Pedagogical and Technological Education) and in association with IEPAS (Institute of Career Guidance and Career), KEMEL (Centre for Volunteer Managers in Greece), Future Leaders and Young Leaders. The goal was to reach a broad spectrum of schools: across urban and rural areas, throughout mainland Greece and the Islands, and those in differing economic circumstances including those in disadvantaged areas. (It should be noted that the ethos of the VISCED piloting was one of 'realism'. The Commission's own 2012 Digital Scoreboard placed Greece towards the bottom of the 27 European Union countries in terms of both home access to the internet and the 'computer skills' of its citizens. As such, the piloting was designed to identify, encourage and analyse innovation in this context. It was not sufficient to identify 'new and effective practices'; these had to have the potential to become 'mainstream' within the challenging Greek context.)

70 teachers, 24 trainers and coordinators in the 16 networked schools undertook educational initiatives to link the school with the labour market with support from trainers or coordinators, who provided the general pedagogical support. The existing NSI Moodle e-learning platform was used to offer teacher training and school development programmes, access to educational resources and interaction opportunities. Teacher Training was offered on two tracks, each of which evolved into three training programmes, as follows:

Track 1: Teacher Professional Development

- Programme A: “Exploring the Innovative Teacher”

- Programme B: “The Reflective Teacher”

- Programme C: “Teacher Leadership”.

Track 2: School Development

- Programme A: “Introduction to Innovation”

- Programme B: “Targeted Innovation”

- Programme C: “Sustainable Innovation”.

Track 1 was a personalised training programme, attended by teachers who participated in the NSI Workshop as a school team, as well as by independent teachers who undertook the training as individuals. Placement in one of the three programmes was dependent on the trainees’ qualifications, skills and competences. Teachers progressed at their own pace depending on the amount of time and effort they could put in and their capacity to contribute. Teachers who joined the training programmes with their school team attended both tracks at the same. Depending on the school’s competencies, it was placed in programme A or B. Placement in programme C required the completion of programme B.

All participating teachers of the same school were placed in a team within the learning platform. The assignments they were asked to undertake required team work, which sometimes involved the participation of other teachers, students and/or parents from their school. The school principal was encouraged to attend, but even in cases where he/she did not attend the training programme, he/she participated in the school development procedure that the school team implemented. Regardless of whether a teacher participated individually or as a member of the school team, they were required to plan, implement and evaluate an educational activity or project destined for use in the school. School teams could work on one or multiple activities which involved the cooperation of teachers and students from their own and/or from other schools. All school teams could only complete Programme C if they had engaged in at least one participative project in cooperation with other schools. In Programmes B and C teachers were encouraged to plan a joint activity with NSI members from other schools and implement it in their own environment. With the assistance of a

network facilitator, results of the parallel implementation of the activity were compared and the teams worked together to draw conclusions and make proposals regarding good practice. Individual teachers were encouraged to search for an activity partner within the network and were all supported by a network facilitator. School teams were assigned a facilitator who coordinated and supported the team's work and provided guidance to the team's members during their course in the teacher professional development track.

All participating teachers expressed a positive view regarding their participation in the piloting programme. This is a very promising outcome when the extreme difficulties of the past school year are taken into account. Furthermore, almost all participating teachers (69 of 70) noted that they benefited a lot as regards their learning design and evaluation skills. In the Greek pilot teacher training was included and a vast majority of the teachers and students said that they had benefitted from the training of the teachers.

8. 21st Century Skills

The interim report on teacher training the challenges of integrating ICT and 21st century skills in these countries (Sorensen et al. 2011 26-38). They were not overtly taught within the pilot or case study teacher training courses. Twenty-first century skills have only recently become an overt part of the most mature teacher training programmes for virtual schools and colleges. For example the VHS professional development is now offering a course called "21st Century Teaching and Learning" and Figure 4 presents the description of the course taken from its web site in November 2102 (http://thevhscollaborative.org/best-practices-series/21st-century-teaching-learning):

> **"Course Overview:**
> Educators need to integrate technology into their curriculum to transform student learning and meet the goals of the 21st century. To succeed in today's information-driven academic environment, students need to know how to find, use, manage, evaluate and convey information efficiently and effectively. This includes not only knowledge of technology, but the ability to use critical-thinking skills to solve problems within a technological environment. Teachers wrap 21st century literacy skills into lesson content using a variety of strategies. This course helps educators plan and assess effective technology teaching methods, incorporate technology into any discipline, and develop key accountability and assessment strategies!
>
> In this six week course, educators wear both a "student hat" and a "teacher hat" as they use digital technology and communication tools to solve problems. Educators experience how to use technology as a tool to research, organize, evaluate and communicate information, as well as develop a fundamental understanding of the ethical/legal issues surrounding the access and use of information. This valuable, first-hand experience demonstrates the essential technology skills students need to succeed in the 21st Century.
>
> **Who Should Attend?**
> This series is appropriate for:
>
> - Teachers who want to effectively utilize a blended model of instruction, using online components to supplement the face-to-face experience of their students
> - Curriculum specialists who need to understand the critical success elements of blended teaching models
> - Administrators who want to experience first-hand the power of online learning while determining their own district's online professional development needs.

What Will You Learn?
Participants attending this course will:

- Use the Internet in instruction efficiently and effectively to develop student-centered, project-based learning that supports the development of 21st century skills
- Create new lessons that incorporate technology applications into their core curriculum
- Transform curriculum with technology-based real-world learning for students
- Design content that enhances learning and fosters students' engagement with technology
- Integrate technology and core content to teach problem solving, analytical skills, and techniques for presentation
- Cite and evaluate Internet sources
- Develop assessment and online safety strategies.

Participation Requirements & Graduate Credit:
Best Practices in Online Teaching and Learning courses are 6-week courses taken entirely over the Internet. Courses move forward on a weekly schedule, and there is a minimum of 8-10 hours of in-class activities per week with additional time for reading, projects, and exploration. Participants who complete **21st Century Teaching and Learning** will earn 67.5 PDPs or 6.75 CEUs.

Each course is eligible for three graduate credits for an additional fee. For details on pricing, options, and course numbers, see the VHS Graduate Credit Overview."

Figure 4. VHS Collaborative's course description for its online teacher training focusing on the integration of 21st century skills for VHS (and other virtual schools) (http://thevhscollaborative.org/best-practices-series/21st-century-teaching-learning November 2012)

9. Recommendations for teacher training

It is recommended that the European Commission, national agencies and organisations with an eCampus for students ages 14-21 consider the following:

- Promote awareness of virtual school and college campuses worldwide, especially those in Europe, including the rapid growth in North America and potential import/export of those courses and resources. Also the need for quality assurance and related teacher training and leadership training. Be prepared with relevant materials to illustrate the potential in order to address misconceptions based on the lack of experience in this mode of schooling.
- The European Commission, educational agencies, professional bodies and education departments offering teacher training are recommended to consider developing and introducing a voluntary set of common standards for online teaching and teacher training for all those who work with an eCampus. This would support nations and regions to recognise and integrate this mode of study and ensure better quality and consistency for students studying online across borders. The standards published by

iNACOL would form a valuable foundation for adaptation guided by the T3 core curriculum framework.

- Develop strategies for quality assurance so that all organizations with eCampus induct teachers who are new to the virtual classroom and undertake require groundwork with mentors, practice with the media and methods. Also ensure that induction and ongoing training and support is provided for adult facilitators who supervise and advocate the learners who rely on an eCampus for one or more courses.
- Where this form of education grows to include most secondary schools and/or students in a region (as it has done in North America and New Zealand) then this mode of schooling is recommended for inclusion in the initial teacher training for that region, in partnership with at least one eCampus to enable field experience for teacher trainees.
- Research and development of teacher training is highly recommended to reflect the diversity of educational systems in Europe for all phases of teacher training: Initial teacher training, induction for staff new to working with an eCampus, and for continuing professional development.

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